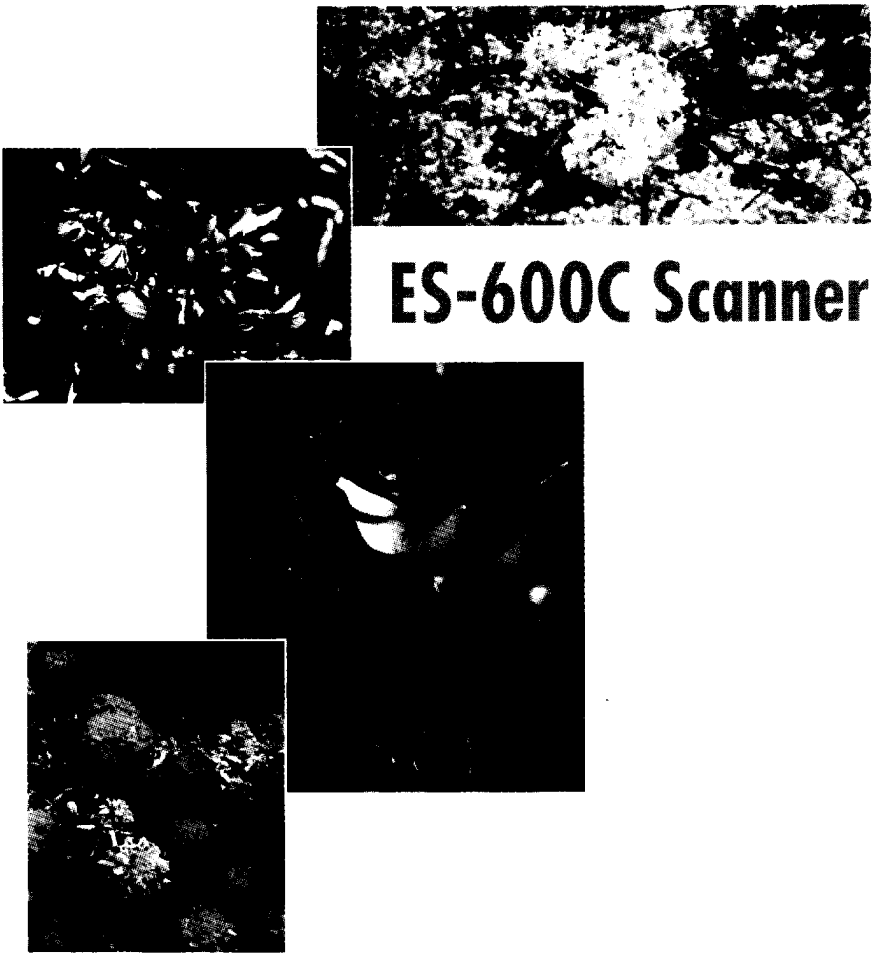
EPSON®



ES-600C Scanner

User's Guide

4001572
CO1-00

FCC COMPLIANCE STATEMENT
FOR AMERICAN USERS

This equipment has been tested and found to comply With the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or television reception. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ❑ Reorient or relocate the receiving antenna
- ❑ Increase the separation between the equipment and receiver
- ❑ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- ❑ Consult the dealer or an experienced radio/TV technician for help.

WARNING

The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment. It is the responsibility of the user to obtain and use a shielded equipment interface cable with this device. If this equipment has more than one interface connector, do not leave cables connected to unused interfaces.

Changes or modifications not expressly approved by Epson America, Inc., could void the user's authority to operate the equipment.

FOR CANADIAN USERS

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le present appareil numérique n'émet pas de bruits radioéctriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le réglement SLU le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

EPSON®

ES-600C Scanner

User's Guide

About the Cover

The cover of this guide was composed entirely using computer graphics software and an Epson scanner. The photographs were scanned at 300 dpi image resolution. The completed layout was color separated on an imagesetter and output to film at 2540 dpi with a screen resolution of 133 lines per inch.

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The Epson® ES-600C is a full-color flatbed image scanner with an 8 1/2 x 11 inch (letter) size scanning area. It has the ability to scan in color (24 bit) or gray-scale monochrome (8 bit), making it ideal for virtually all uses, from simple drawings to complex full-color illustrations.

The ES-600C comes in two models, one with a bidirectional parallel interface and one with a SCSI (Small Computer System Interface). This manual covers both models. For either model, you need an optional Epson interface kit to connect the scanner to your computer.

For the bidirectional interface model, use Epson's Bidirectional Parallel Interface Kit for DOS Computers (BIDIDOS). For the SCSI model, use either Epson's Interface Kit for Macintosh® Computers (ESMAC) or Epson's SCSI Kit for DOS Computers (SCSIDOS), depending on which computer you have.

Options

Automatic Document **Feeder (B813011)**
This option is designed primarily for optical character recognition (OCR) scanning. With software that supports the ES-600C and OCR, you can stack up to 50 pages in the automatic document feeder and scan them automatically. You can then use them in a word processing program just as if you had typed them yourself.

Transparency Unit (8813021)
This option allows you to scan transparent materials, primarily 35mm slides and negatives, in 24-bit color.

How to Use This Manual

Chapter 1 describes setting up your scanner. Be sure to read this first. Chapter 2 tells how to use the interface kits to connect the scanner to your computer. The basic information in Chapter 3 helps you use your software and scanner, and Chapter 4 contains troubleshooting, maintenance, and transportation information. Chapter 5 and the Appendix provide technical information. See the end of this guide for a glossary of scanner terms and an index.

Warnings, Cautions, and Notes

Warnings
must be followed carefully to avoid damage to your scanner and computer.

Cautions
should be followed carefully to ensure your scanner operates correctly.

Notes
contain important information and useful tips on the operation of your scanner.

Where to Get Help

Epson America provides local customer support and service through a nationwide network of authorized Epson dealers and Service Centers.

Epson also provides the following support services through the Epson Consumer Resource Center at (800) 92243911:

- Assistance in locating your nearest Authorized Epson Reseller or Service Center
- Technical assistance with the installation, configuration, and operation of Epson products
- Epson technical information library fax service
- Product literature with technical specifications on our current and new products
- Sales of supplies, parts, documentation, and accessories for your Epson product
- Customer Relations
- User group locations.

Important Safety Instructions

1. Read all of these instructions.

2. Follow all warnings and instructions marked on the scanner.

3. Unplug this scanner from the wall outlet before cleaning. Use a damp cloth for cleaning and do not use liquid or aerosol cleaners.

4. Do not use this scanner near water.

5. Do not place the scanner on an unstable cart, stand, or table because it may fall, causing serious damage.

6. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation and protection from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the scanner on a bed, sofa, rug, or other similar surface. The scanner should never be placed near or over a radiator or heat register, and it should not be placed in a built-in installation unless proper ventilation is provided.

7. Use the type of power source indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.

8. This product may be equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.

9. Do not put your scanner where the cord will be walked on.

10. If you use an extension cord, make sure that the total of **the** ampere ratings **on** the products plugged into **the** extension cord does not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does **not exceed 15** amperes.

11. Never push objects of **any** kind **through** cabinet slots as they may touch dangerous voltage points or **short out** parts that could result in a risk of fire or electric shock. Never spill liquid of any kind **on the** scanner.

12. Except as specifically explained in *the User's Guide,* do not attempt to service this product yourself. **Opening** or removing those covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks. Refer all servicing in those compartments to service personnel.

13. Unplug this scanner from the wall outlet and refer servicing to qualified service personnel under **the** following conditions:

    A. When **the** power cord or plug is damaged or frayed.

    B. If liquid has **been** spilled into it.

    C. If it has been exposed to rain or water.

    D. If it does not operate normally when the operating instructions are followed. Adjust only **those** controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore **the** product to **normal** operation.

    E. If it has been dropped or the cabinet has been damaged.

    F. If it exhibits **a distinct change** in performance, indicating a need for service.

Chapter 1
Setup

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1 Choosing a place for the scanner

You should consider the following when selecting a location for your scanner:

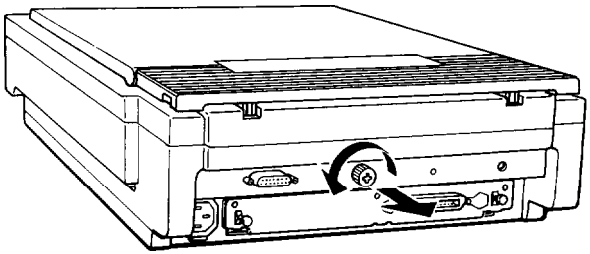
- ❑ Place the scanner on a flat, horizontal, stable surface. If the scanner is tilted or at an angle, it cannot operate properly.
- ❑ Place the scanner close enough to the computer for the cable to reach.
- ❑ Allow some space behind the scanner for the cables, and make sure to place the scanner where you can easily unplug the power cord. Also allow sufficient space above the scanner so that you can easily place and adjust documents on the scanner.
- ❑ Keep the scanner away from high temperatures and humidity and places subject to rapid changes of temperature and humidity.
- ❑ Keep the scanner away from direct sunlight and strong light sources.
- ❑ Avoid places subject to shocks and vibrations.

2 Removing the transportation screw

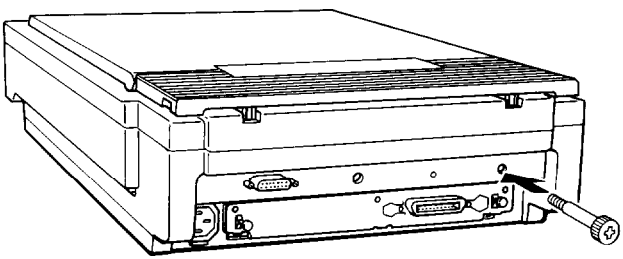
before connecting the scanner to a power source, you must remove the transportation screw.

1. Place the scanner on a flat, stable surface so that its rear panel is facing you.
2. Locate the round screw knob in the middle of the rear panel under the word CLAMP.

3. Remove the screw by turning it counterclockwise.



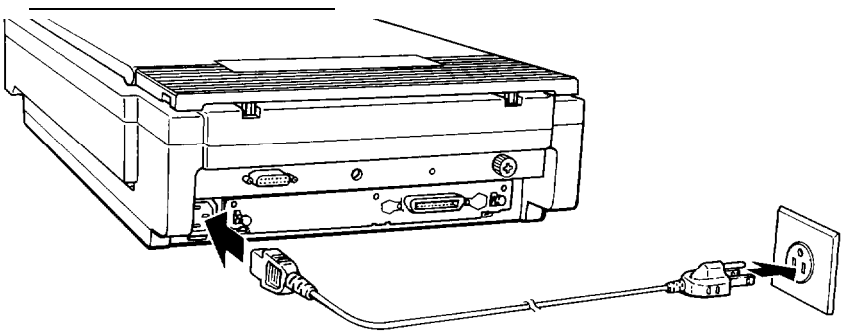
4. Push the screw into the storage hole on the right under the word STOCK. It does not screw in. Make sure you push it all the way into the hole.



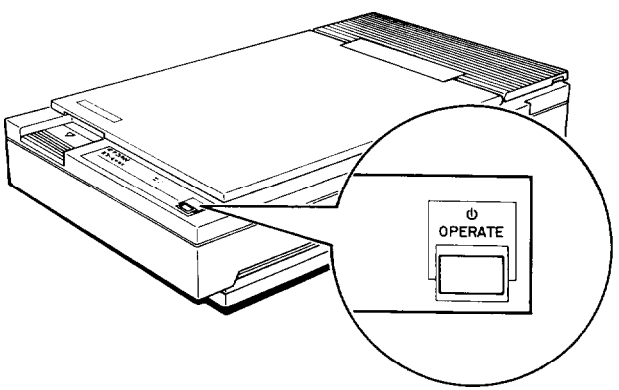
Caution:
Do *not discard the transportation screw. You need it when you transport the scanner.*

3 Plugging in the scanner

1. Firmly connect the power cable to the power inlet on the rear of the scanner and the other end into an appropriately grounded outlet as shown below.



2. If any of the scanner's lamps come on, press the **OPERATE** button to turn the scanner off.



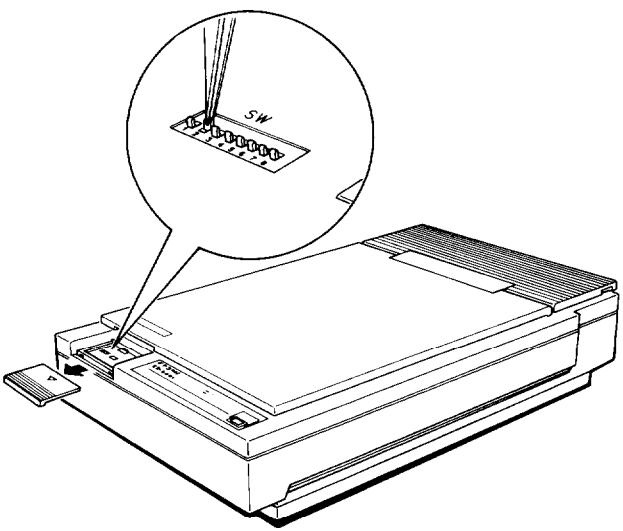
Warning:
Whenever you turn of the scanner, wait at least 10 seconds before turning it back on. Rapidly turning it on and off can *damage the scanner.*

4 Setting the DIP switches

There is a bank of DIP switches under the small cover on the top left side of the scanner. Normally you do not need to change the switch settings, but for the self test follow these steps:

1. Make sure that the scanner is turned off and remove the DIP-switch cover by pressing down on the arrow on the cover and sliding it toward you.

2. Turn switches 1 and 2 to ON. All others should be OFF. Use a pen, tweezers, or other pointed object to change the DIP-switch setting.



3. Replace the DIP-switch cover.

5 Self test

This test doesn't read an image or send any image data. It simply lets you see that the scanner is operating properly before you connect it to your computer.

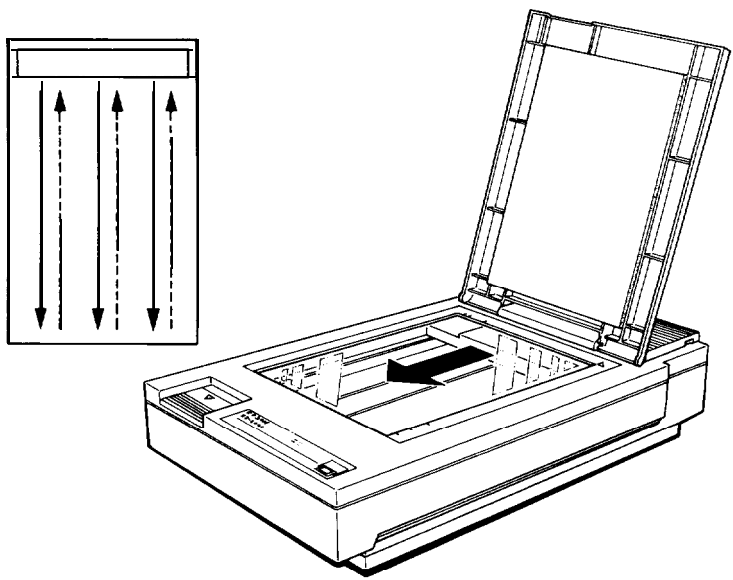
1. Open the document cover so you can see the operation of the scanner during the self test.

2. Turn on the scanner by pressing the **OPERATE** button.

When the scanner is initializing, the fluorescent lamps on the carriage flash and the carriage's position is reset. If the carriage is not at the home position (the rear of the scanner), it moves to the home position before checking the fluorescent lamps.

The scanner next goes through a lamp test sequence. The carriage starts moving from the rear of the scanner (the home position) toward the front, with the green lamp on.

After the carriage reaches the front end of the document table, it rapidly returns to the home position with the lamp turned off. The scanner repeats the action two times, once for the red lamp and once for the blue lamp. Then the carriage returns to the home position and the **self** test **is** over. The **READY** light comes on.



If the scanner does not work as described, turn it off. Then make sure that you have removed the transportation screw and that the power cord is firmly plugged in and turn it on again.

If that doesn't solve the problem, contact your dealer or call 1-800-9228911.

6 *Resetting the DIP switches*

1. Make sure that the scanner is turned off and remove the DIP-switch cover by sliding it toward you.

2. Turn switches 1 and 2 to OFF. All others should be OFF. Use a pen, tweezers, or other pointed object to change the DIP-switch setting.

3. Replace the DIP-switch cover by sliding it back to its original position.

Chapter 2

Connecting the Scanner to the Computer

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Using an Interface Kit

Your scanner is either the bidirectional parallel interface model or the SCSI (Small Computer System Interface) model. You must use an interface kit appropriate to your computer.

Interface types

- If your scanner is the bidirectional parallel interface model:

  Use Epson's Bidirectional Parallel Interface Kit for DOS Computers. There is a bidirectional parallel interface board in the kit. Install it in your computer. Then connect the scanner to the computer.

  Note:
  IBM's PS/2 computers have built-in bi-directional parallel interfaces. You do not need to install one in those computers unless you need the built-in parallel interfacefor your printer.

- If your scanner is the SCSI model, you can use either of these interface kits:

  With Epson's Interface Kit for Macintosh Computers, you just connect the scanner to your Macintosh.

  With Epson's SCSI Kit for DOS Computers, you install the SCSI board from the kit into the computer. Then you connect the scanner to the computer.

Parallel interface Model

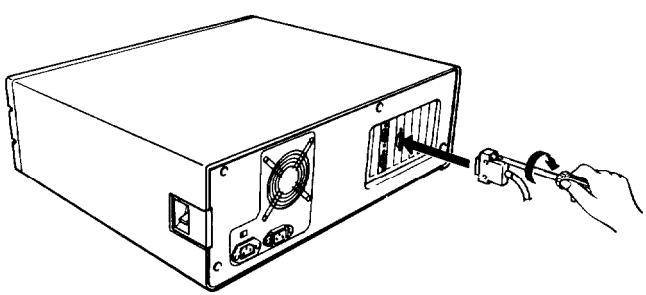
For this model, you use the optional Epson Bidirectional Interface Kit for DOS Computers. It contains a bidirectional interface board, a cable, and software. You first install the board in your computer, using the instructions in your computer manual. Then you connect the scanner to your computer with the cable.

Connecting the parallel interface

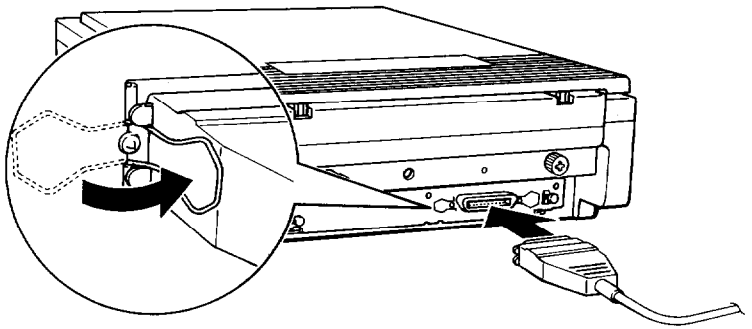
Use the cable from the Bidirectional Interface Kit for DOS Computers.

1. Make sure that both the scanner and computer are turned Off.

2. Connect the 25-pin end of the cable to the computer, then tighten the screws on the sides of the connector.



3. Connect the 36pin end of the cable to the scanner; then fasten the connector with the clamps on the sides of the connector.



Warning:
Do not conned more than one interface cable to the scanner at a time. Always use a shielded cable.

SCSI Model

For this model, you use either the Epson SCSI Kit for DOS Computers or the Epson SCSI Kit for the Macintosh. The DOS kit includes a SCSI board for your computer, a cable, and software. You install the SCSI board in your computer, following the instructions in your computer manual. Then follow the directions below to connect your scanner and computer. All Macintoshes have SCSI ports, so the Macintosh kit contains only the cable and software. Follow the directions below to connect the scanner to your Macintosh.

SCSI connections

The SCSI interface allows you to connect up to eight devices, including the computer, in what is called a daisy-chain arrangement. A daisy chain is made up of a computer and one or more SCSI devices. Only the first SCSI device is connected to the computer; each of the other devices is connected to the previous device.

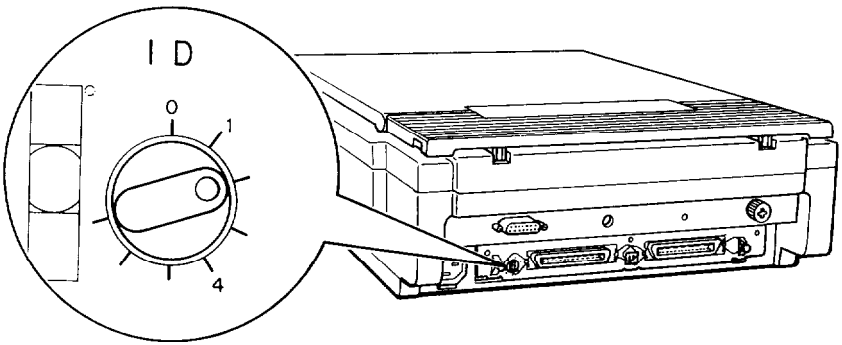
Each device has a SCSI ID number: the computer is number 7, and each of the other devices must have a different number between 0 and 6. Also, the first device and the last device in the chain (not including the computer) must have a terminator, and no other device can have a terminator.

If you connect other SCSI devices in addition to the scanner to your computer, make the scanner the last device in the daisy chain: plug the scanner into the 50-pin connector on the next to last device in the chain. For this connection you will need a SCSI cable with 50-pin connectors on both ends.

SCSI ID number setting

The factory set SCSI ID of the scanner is 2. The computer is always ID number 7. If you are going to add the scanner to a system in which one of your SCSI devices already has a SCSI ID of 2, change the ID number of the scanner to an unused number as described next.

1. Locate the SCSI ID rotary switch next to the SCSI connectors on the rear panel of the scanner.

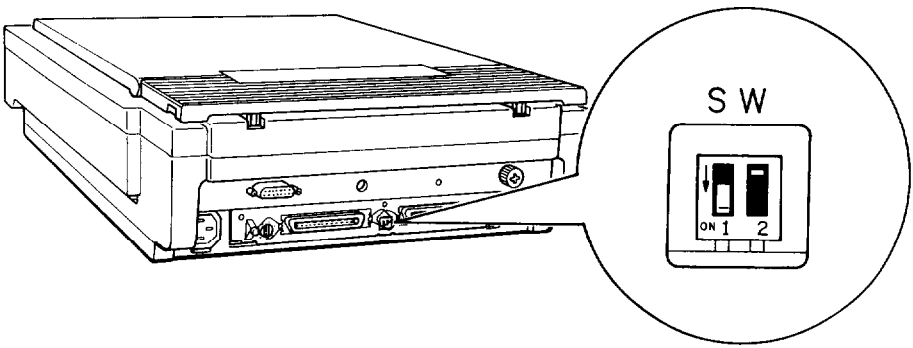


2. To change the SCSI ID, turn the small dial to the desired number.

Caution:
Do not set the SCSI ID to 8 or 9, and do not set the ID number to an ID that is already assigned to another device. The computer, scanner, and other devices will not function properly.

Terminator setting

If the scanner is the only SCSI device you are going to connect to your computer or if it is the last device in the daisy chain, leave the terminator on. The terminator is on when Switch 1 of the terminator switches, located between the SCSI connector on the rear panel, is on. See below for the location of the switches.



The scanner should always be the last device on the daisy chain. You do not need to change the factory settings for the terminator switches as long as the scanner is the only SCSI device or the last SCSI device in the daisy chain.

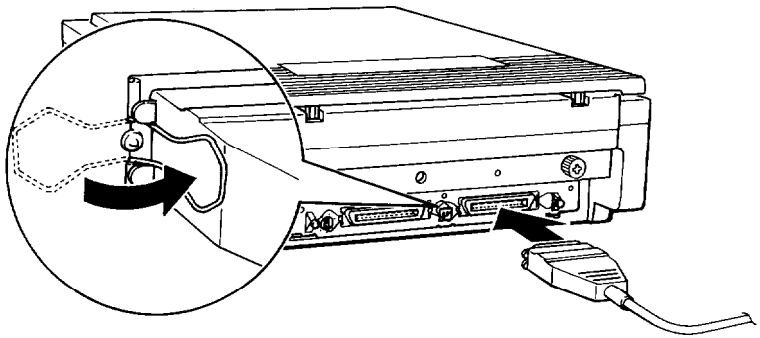
If you decide to connect the scanner in the middle of the daisy chain, turn terminator Switch 1 off. (Switch 2 must always be off.)

Connecting the SCSI

connect the scanner with the SCSI as follows:

1. See that the scanner, the computer, and all other SCSI devices are turned off and unplugged from the power source.

2. Connect the 50-pin end of the cable to either the right or left SCSI connector of the scanner; then fasten the connector with the clamps on the sides of the connector.



3. Connect the 25-pin end of the cable to the SCSI port of your computer. If you are connecting the scanner to a SCSI device other than the computer, use a cable with 50-pin connectors on both ends. Then fasten the connector with the clamps on the sides of the connector.

   Note:
   The SCSI port of the Macintosh is the larger port with the ***diamond shaped*** *icon* ***over*** *it.*

4. The connection is now complete. Connect the power cables.

5. Always turn on the scanner first; then start the computer.

Power-on sequence

You must turn on SCSI devices with terminators (the first and last devices in the daisy chain) before you turn the computer on so that information can pass through the SCSI port. If you do not turn on these devices first, the computer may not start up.

If you have an internal hard disk, turn on the scanner and any other SCSI devices you plan to use. Wait a few seconds; then turn on the computer.

If you have an external hard disk, turn on the scanner, external hard disk (first on the daisy chain), and any other SCSI devices you plan to use. Wait a few seconds; then turn on the computer.

SCSI devices in the middle of the daisy chain may be left off if you don't plan to use them.

Now that you have connected the scanner to your Computer, the next thing to do is install the software included in your Epson interface kit. Follow the directions in the interface kit and in the software manuals. Then read Chapter 3, "Scanner Basics," before your first scan.

Chapter 3
Scanner Basics

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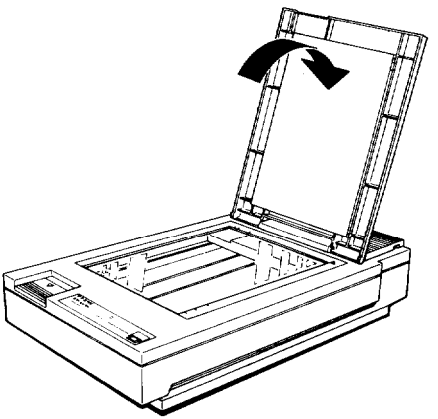
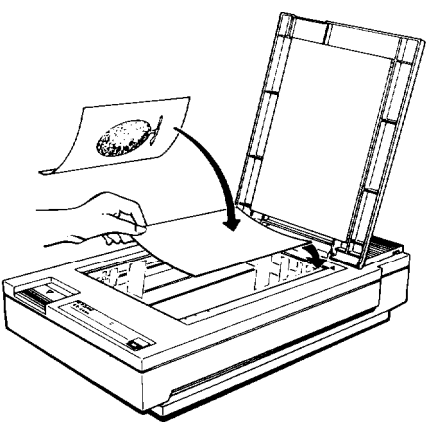
Placing a Document on the Scanner

1. Turn on the scanner and computer. See that the scanner's **READY** light has come on.

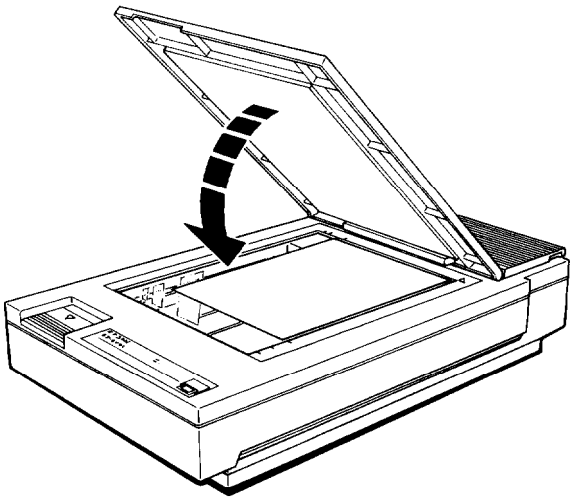
2. Open the document cover.



3. Place the document on the document table, with the side to be scanned down. Make sure that the document is carefully aligned.



4. Close the document cover gently so that the aligned document is not moved.



Note:
Make sure that the document is flat against the glass surface so that the image is properlyfocused. Also make sure to close the document cover. This prevents interference from external light.

Always keep the document table clean. See Chapter 4 for information on cleaning the ***scanner.***

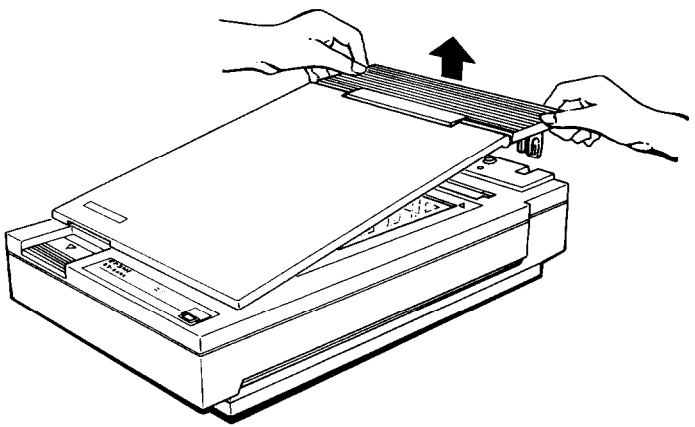
Avoid twisting the document cover when you open **or close** *it.*

Do not leave photographs on the document table for an extended period of time; they may stick to the glass.

5. Start the scanner software on the computer, and follow its procedures to scan the image.

Note:
If you are scanning a large object that will nut fit under the document cover, you can remove the document cover temporarily.

To remove the document cover, hold the base of the cover and pull it straight up. To m-attach the document cover, insert the metal tongues in the slot on top of the scanner. Make sure to hold the base of the document cover when you remove or attach it.



Scanner Setting Guidelines

This overview of scanner settings will give you a little background for using your scanning software. You can read it before you start using your software or come back to it after you start using your scanner if you need a simplified explanation of the fundamentals of scanning.

The messages on the screen and your software manual should be your main guide to scanning, but these basics can supplement your understanding of your software's on-screen menus. This section refers to some examples found in the *Color Image Sumner* booklet included with your scanner.

Each ✔ icon indicates a setting that you make or check. The first two are the most important.

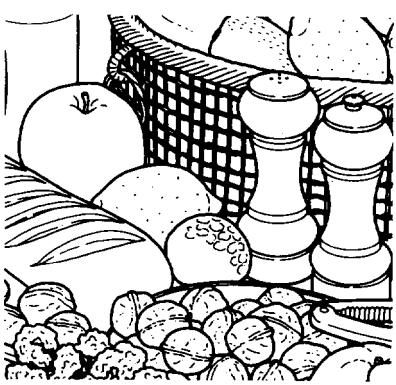
Note:
Your software may use a somewhat different 0rder or slightly different terminology.

✔ Image type or mode

For the best and most efficient scans, you need to know which type of images you are scanning: drawings, black and white photographs, or color photographs. The corresponding terms used by scanning software are *line art, gray* scale, and color.

fine art

This is the setting for drawings, including all drawings or pictures made up of black and white only, with no gray tones. Both of the illustrations below are line art even though the artist has used lines that look like shading in the second one.



Gray scale (also ***called monochrome or continuous tone)***

This is the setting for black and white photographs and drawings with various shades of gray in addition to black and white. You can also use this setting for color photographs that will be printed in black and white.

Color

This is the setting for color photographs or other originals in color. (Your software may have several color settings. Use 24-bit RGB, three-pass, and/or page-sequence mode or equivalent settings.)

Note:
Scans from photographs are better than scans from *printed images, such as newspaper or magazine pictures, because of halftoning conflicts. Use photographs instead of the color images in the* Color Image Scanner *booklet for experimenting with your scanner.*

✔ Resolution

The best resolution setting depends on the image type or mode (line art, gray scale, or color) and the printing method. Read "Printing methods" and "File size" below; then use the table on page 3-9 to find the resolution you should use.

Printing methods

The best resolution to use depends on what type of output or printing method you will be using. The usual printing methods for scanned images fall into the following categories.

- *Black and white printers* (laser, inkjet, or dot matrix) are good to excellent for text and line art but are not as good for gray scale images. These printers can be used for reproducing photographs in documents like newsletters that do not require the highest quality. The example below shows the typical quality of a photograph printed on a laser printer.

- *Electronic color printers* use laser, ink jet, or other technologies to produce color or gray scale images that range from coarsely patterned to nearly photographic (often called continuous tone) quality. It is best to see samples from a color printer before you decide to use it. The upper left and lower left squares on the cover of the *Color* Image *Scanner* booklet give you an idea of the different print qualities you might get from electronic color printers. These printers are usually used for small quantities of color images or for preliminary proofs of images that will be printed on a printing press.

- *Printing* presses are for high quality and high volume work. You scan and edit your images and then send the files to a service bureau or printing company, which uses high resolution phototypesetters (also called imagesetters) like the Linotronic™ 300 for high quality text and gray-scale images. For full-color images, you scan in color and then use your image editing software to manipulate the image and produce *color separation* files. If you plan to do this, see the guidelines below on resolution and then follow the instructions in your software manual for making separations. Your service bureau or printing company should also provide helpful information.

File size

In gray scale and color, use the lowest resolution that gives acceptable quality for your printing method because high resolutions mean large files. A letter-size full-color scan uses as much as 25 megabytes (MB) of disk space.

Large files use up your computer and hard disk memory; they take longer to process, to print, or to transmit by modem; and they are more difficult to save to a disk for sending to a service bureau or printing company.

Many printing methods cannot use all of the information stored in a high-resolution scan, so in these cases part of the information is wasted.

For example, the file size of the image on page 3-7 is only 40K because it was scanned in gray scale at 75 dpi. Scanning the same image at 300 dpi in gray scale would require a file size of 660K, and 24-bit color at 300 dpi would require 1900K (nearly 2 megabytes).

Resolution guidelines

This table shows the recommended resolutions in dots per inch or pixels per inch for the image types and printing methods just described. Also, you may want to experiment with your scanner settings, possibly using a cropped version of your image to save time, until you achieve the desired results.

Resolution guidelines

	Line art	Gray scale	Color
Black and white printer	300	75	75
Electronic color printer	300	150-200	150-200
Printing press/ Imagesetter	300-600	150-200	150-200

Tip: Here's how to calculate more precisely the required resolution for gray scale or color on an electronic color printer or a printing press:

1. Find out the lines per inch of the printing method. This is the measurement of resolution for high quality image printing. Do not confuse it with dots per inch, which is not an equivalent measurement.

2. Multiply the lines per inch by two to find the best scanning resolution. For example, for 133 lines per inch (a common resolution for magazines and books), scan your image at 266 dpi (2 x 133 = 266).

Tip: For even smaller file sizes, try scanning at about 1.5 times the lines per inch. This may cause little or no perceptible loss of output quality.

Note:
For color or gray scale images, ignore the dpi (dots per inch) resolution of your printing device. Even though your service bureau may use an imagesetter with a 2400 dpi resolution, a scan resolution of only 150 to 250 dpi will produce the highest quality gray scale or color images the imagesetter can print. Similarly, even though your laser printer may have a 300 dpi resolution, it requires a scan resolution of only 75 to 100 dpi to obtain the best quality gray scale images it can print.

✔ Size of scale

This is usually expressed as a percentage. If you want your printed image to be larger than the original, increase its size with this setting. If you are not sure how large you want the printed image, choose the largest size you might use. You can reduce the image size later with your software. (You can also increase the size with your software, but you may lose some quality.)

Note:
The size of the image on your monitor will probably be diferent from the size of the image when you print it.

✔ Halftoning and dropout

For nearly all uses, none is the best setting for these. In case you have special needs that require halftoning at the time of scanning, see the Appendix for technical information on halftoning, dithering, and dropout on the ES-600C.

✔ Brightness

The minus numbers lighten the image, the plus numbers darken the image. To lighten a dark original use -1 to -3, or to darken a light original use +l to +3. Usually you should leave this setting at zero.

✔ Color correction

Use the default or CRT display.

✔ Gamma correction

Use the default or CRT Display B.

✔ Cropping

If you know you are going to use only part of an original, use your software's cropping tools before you scan (if possible) to select only the part of the image that you will use. This will make your image file smaller.

Judging Image Quality

When you look at your monitor to evaluate a scanned image, remember that the image will look different when it is printed. A monitor is a comparatively low-resolution device; some images that look good on a monitor do not look as good when printed and vice versa. Keep in mind the final output device as you choose settings and manipulate the image.

In addition, each output device may produce different results. A proof printed on an electronic color printer will look different from the same image printed on a printing press.

Equipment

Your present equipment may be sufficient for your scanning needs, but if you are not satisfied with the quality of the images on your monitor or with the speed of image processing, read this section. While it does not contain specific recommendations, it describes various possibilities for improving your scanning system. For further information, see your dealer or an experienced scanner user.

RAM and hard disk size

Scanned images can use much more memory than text files, so you may need more Random Access Memory (RAM) in your computer and a larger hard disk than you have used previously.

Accelerator boards

In addition to memory, processing speed is important because large files take longer to process than small ones. Therefore, you may want to add an accelerator board to your computer.

Video cards

A video card that is sufficient for text may not be good enough for displaying graphic images, especially in color. If all your scanned images look coarse on your monitor, you may want to upgrade your video card.

Monitors

The resolution of your monitor, of course, also affects the quality of the image you see. Consider a high resolution monitor if you do precise color work, but first be sure you have the right video card.

File compression software

Many different programs are available to make image files smaller for storage or transmission. For example, they can enable you to store a 3MB image file on a floppy disk. Some compression software can compress images and restore them with no loss of data or quality; others compress images more, but the restored file is not exactly the same as the original. The difference between the original and restored files is, however, not always noticeable.

Chapter 4
Troubleshooting and Maintenance

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Problems and Solutions

The problems you may have while using the scanner often involve the operation of your software and computer. Problems fall in the following major categories:

- ❑ Incorrect setup of the interface
- ❑ Inappropriate selection of the scanner functions
- ❑ Incorrect setup of your computer or software
- ❑ Incorrect operation of your software.

Also see the documentation that came with your software, computer, and printer for possible solutions.

Note:
if you need to reset your scanner, use the RESETbutton under the DIP-switch cover.

The **READY** light does not come on.

Make sure the scanner is correctly connected to the computer and that the computer is turned on.

Make sure the power cable is correctly plugged into the scanner and the power outlet.

The scanner does not start scanning.

See that the scanner's READY light is on.

Make sure that you have selected the correct interface port and settings with your software. Also make sure the interface board on your computer is properly installed.

If you are connecting the scanner with the SCSI interface, see that the terminator and SCSI ID are correctly set up.

If you have other expansion boards in your computer, see that they are not interfering with the interrupt setting of the interface board for your scanner. (See your computer manual.)

The scanner software does not work properly.

Be sure you have correctly installed your software.

Check that the system requirements, such as the operating system version, are correct for using your software.

See if the computer has enough memory for your software. If you are running other software at the same time, using RAM resident programs, or have many device drivers, the computer may not have enough memory remaining. (See your software and computer manuals.)

See whether your software supports the ES-600C. If it does, make sure that you correctly installed or set up the software. (See your software manuals.) If your software does not support the ES-600C, select the Epson ES-300C. If the software still does not work properly, turn on the ES-300C emulation by turning DIP Switch l-8 on. If your software supports the ES-300C, your scanner can use the ES-300C emulation although a few of its functions may not be available.

The entire image is distorted or blurred.

Make sure **that the** document is placed flat against **the** document table (the glass area).

You may have accidentally moved the document during scanning. Check the position of the document and do not move it while the scanner is operating.

See that the scanner is not tilted or placed on an unstable surface.

Part of the image is distorted or blurred.

Part of the document may be wrinkled, warped, or not in contact with the document table (the glass **area).** Be sure the document is uniformly flat.

Caution:
Do *not place heavy objects on the document table.*

The edges of the document are not scanned.

The document table has non-readable areas around the edges. Adjust your document's position so that the image comes inside the readable area.

Color is patchy or distorted at the edges of the document.

If the document is very thick or warped at the edges, the edges of the image may be colored. Cover the edges of the document with opaque paper to avoid having outside light interfere.

If part of the document is outside the document table, the edge may not be in contact with the document table and may be discolored. Change the position of the document.

The image is faint or out of focus.

Check that the document is placed flush against the document table.

Check your gamma correction setting. If it is set for printer, the image looks lighter when displayed on a monitor.

Make the brightness setting darker. (The lightest setting is -3 and the darkest is +3.)

The image is too dark.

Adjust the brightness with your software. Also check the brightness and contrast values of your display screen.

Straight lines in the image are jagged.

The document may be placed at an angle on the document table. Align it so that the horizontal and vertical lines are carefully aligned with the scales on the top and side of the document table.

The **image does not look the same as the original.**

Try different settings and combinations of the scanner functions.

Check that your software is correctly installed. Check the capability of your software and computer. (See your software and computer manuals.)

If you are importing an image file into your application software, see if the file format is acceptable for your software. Also check that the settings of your application and your image match. (See your software manual.)

A line of dots is always missing on the scanned image.

If this happens on your printed image only, your printer or its print head is probably malfunctioning. (See your printer manual.)

If this happens on both your screen and printout, the scanner's sensor may be malfunctioning. Consult your dealer.

When halftoning is used, textured patterns composed of a series of dots appear on particular areas of an image.

This is normal. See the Appendix for examples of halftoning.

The color on the display seems different from that of the original image.

Check the settings of the scanner functions, especially data format (bits/pixel/color), gamma correction, and color correction. Try a different combination of these settings.

Check the capability of your computer, display adapter, and software. Some computers can change the color palette to adjust colors on your screen. (See your computer manual.)

The printed color seems different from that of the originals.

Exact reproduction of colors is very difficult. See your software manual or your printing company for guidance on color matching.

The printed image is larger or smaller than the original size.

Check the image size settings in your software.

The image cannot be printed on the printer, the printout is garbled, or the printout is not an image.

Check that the printer is properly connected with the computer and is correctly set up. (See your printer manual.)

Check that your software is properly installed and set up for your printer. (See your software manual.)

Maintenance

To keep your scanner operating at its best, you should clean it periodically. Before cleaning, unplug the power cable.

Clean the outer case with mild detergent dissolved in water.

If the glass of the document table gets dirty, clean it with a soft dry cloth. If the glass is stained with grease or other hard-to-remove material, use a small amount of glass cleaner on a soft cloth to remove it. Wipe off any remaining liquid with a dry cloth.

Warning:
Be careful not to get water on the scanner mechanism or electrical components.

Caution:
Do not scratch or damage the glass of the document table, and do not use a hard or abrasive brush to clean it. A damaged glass surface can decrease the reading quality.

Never use alcohol, thinner or corrosive solvent to clean the scanner. These chemicals *can damage the scanner components as well as the case.*

Be careful not to spill liquid into the scanner mechanism or electronic components. This could permanently damage the mechanism and circuit y.

Do not spray lubricants inside the scanner.

Never open the scanner case.

Replacing the fluorescent lamps

The luminosity of the fluorescent lamps declines over time. If the lamps break or become too dim to operate normally, the scanner stops working and both the **READY** light and the **ERROR** light blink. When this happens, the lamp assembly must be replaced. For details, contact your dealer.

Warning:
Never open the case of the scanner. *If you think repairs or adjustments are necessary, consult your dealer.*

Transporting the Scanner

When you transport the scanner a long distance, or store it for an extended period, follow the steps below to secure the carriage.

1. Turn on the scanner and wait until the carriage moves to the home position (the back of the scanner). Then turn off the scanner.

2. Remove the transportation screw from the storage hole and screw it into the center hole to secure the carriage.

Note:
If the scanner is broken, ***the*** carriage may ***not*** automatically *return to the home position. If it* ***does*** *not, raise the front of the scanner and* ***hold*** *it in a vertical position until the carriage comes to rest at the back of the scanner. Then perfom Step 2 above.*

Chapter 5

Technical Specifications

Scanner Specifications *5-2*

Electrical Specifications 5-4

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Scanner Specifications

Scanner type:	Flatbed, color/monochrome
Photoelectric device:	CCD line sensor
Effective pixels:	2550 dots by 3510 dots at 300 dpi, 100%
Maximum document size:	**216** mm by 297 mm (8.5 inches by **11.7** inches) US letter size or A4
Scanning resolution:	300 dpi
Output resolution:	**50**, **60**, **72**, **75**, **80**, **90**, **100**, **120**, **133**, **144**, 150, 160, 175, 180, 200, 216, 240, 300, 320, 360, 400, 401 and 600 dpi. Values above 300 through software interpolation.
Scanning speed:	Monochrome mode: about 20 seconds Color page sequence mode: about 70 seconds Color line sequence mode: about 80 seconds
Color separation:	By switching light sources (G, R, B)
Reading sequence:	Monochrome mode: One-time scanning (Dropout color selectable from Green, Red or Blue.) Color page sequence mode: Three-time scanning (G, R, B) Color line sequence mode: One-time scanning (G, R, B)

Size:	*50%* to 200% in 1% steps.
Image data:	8 bits per pixel per color maximum
Gradation:	8 bits per pixel per color maximum
Brightness:	*7* levels
Halftoning process:	Enable/disable selectable. 3 halftoning modes (A, B, and C) and *4* dither patterns (A, B, C, and D) for bi-level data (Halftoning mode A only in color line sequence mode) (2 downloadable dither patterns) Halftoning mode A for quad-level data
Gamma correction:	2 for CRT display 3 for printer 1 for user defined
Color correction:	1 type for CRT display 3 types for printer output, available in color line sequence mode only
Interface:	Bidirectional parallel or SCSI
light source:	Noble gas fluorescent lamps (3 lamps)
Reliability:	Main unit: MCBF 100,000 cycles of carriage movements
Dimensions and weight:	Width: 333 mm (13 inches) Depth: 568 mm (22 inches) Height: 125 mm (5 inches) Weight: about 9 kg (20 lbs)

Electrical Specifications

Voltage: *120* VAC, + lO%

Frequency: *49.5* to 60.5 Hz

Power consumption: Approx. 20 W (self test in monochrome mode)

Insulation resistance: 10 MQ between AC power line and chassis at 500 VDC

Environmental Conditions

Temperature: Operation: 40 ° F to 95° F (5° C to 35° C)
Storage: 10° F to 150° F (-20" C to 60° C)

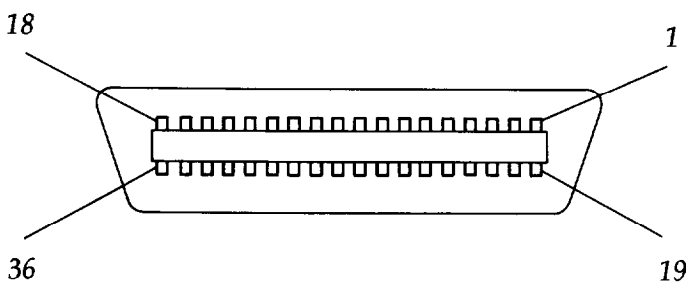
Humidity: Operation: 10% to 80%, without condensation
Storage: 10% to 85%, without condensation

Operating conditions: Ordinary office or home conditions.
Extreme dust should be avoided.
Operation under direct sunlight or near a strong light source should be avoided.

Note:
Specifications are subject to change without notice.

Parallel Interface Specifications

Interface type:	Bidirectional parallel interface
Data format:	8-bit parallel
Synchronization:	By external strobe pulse
Handshaking:	By ACKNLG and BUSY signals
Logic level:	Input/output data and interface control signals are TTL level compatible
Connector type:	36-pin Centronics® type connector
Connector pin arrangement:	



Signal pin assignments

Pin No.	Return pin	Signal	Direction	Function
1	19	$\overline{\text{STROBE}}$	IN/(OUT)	$\overline{\text{STROBE}}$ pulse to read in or send out data. Pulse width must be more than 0.5 microseconds at the receiving terminal.
2 3 4 5 6 7 8 9	20 21 22 23 24 25 26 27	DATA0 DATA1 DATA2 DATA3 DATA4 DATA5 DATA6 DATA7	IN/OUT IN/OUT IN/OUT IN/OUT IN/OUT IN/OUT IN/OUT IN/OUT	These signals represent information of bits 1 to 8 respectively. Each signal is at a high level when data is logical 1 and low when it is logical 0.
10	28	$\overline{\text{ACKNLG}}$	OUT/(IN)	About a 12-microsecond pulse. Low indicates that data has been received and that the scanner is ready to accept more data.
11	29	BUSY	OUT/(IN)	When this signal is high, the scanner cannot receive data. The signal is high: 1) during data entry 2) during scanning 3) when the scanner is not ready 4) when the scanner has an error
12-15	—	NC	—	Not used
16	—	GND	—	Logical ground level
17	—	C-GND	—	Scanner chassis ground
18	—	NC	—	Not used
19-30	—	—	—	Twisted pair return signal ground level

Pin No.	Return pin	Signal	Direction	Function
31	—	$\overline{\text{INIT}}$	IN	When this signal level becomes low, the scanner is reset to the state when power is turned on. This level is usually High. The pulse width must be more than 50 microseconds at the receiving terminal.
32	—	NC	—	Not used
33	—	GND	—	Twisted pair return signal ground level
34-35	—	NC	—	Not used
36	—	DIR	IN	Low indicates the direction is input.

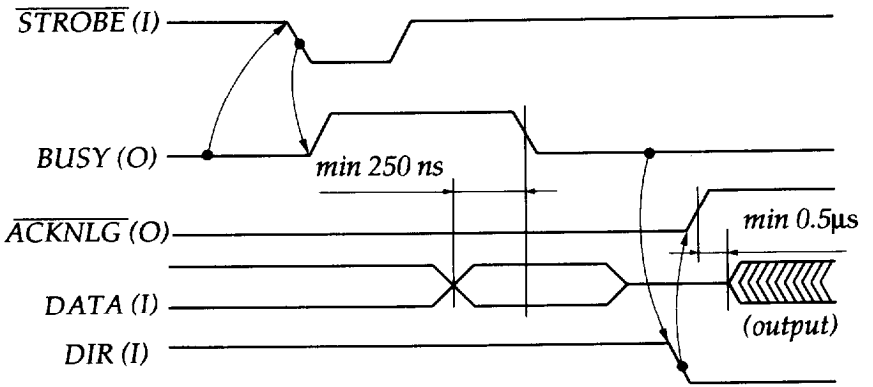
- "Return" denotes the twisted-pair return, to be connected at signal ground level. For interface wiring, be sure to use a twisted-pair cable for each signal, and to complete the connection on the return side. These cables should be shielded and the ground connected to the chassis of the host computer and the scanner.

- All interface conditions are based on TTL level.

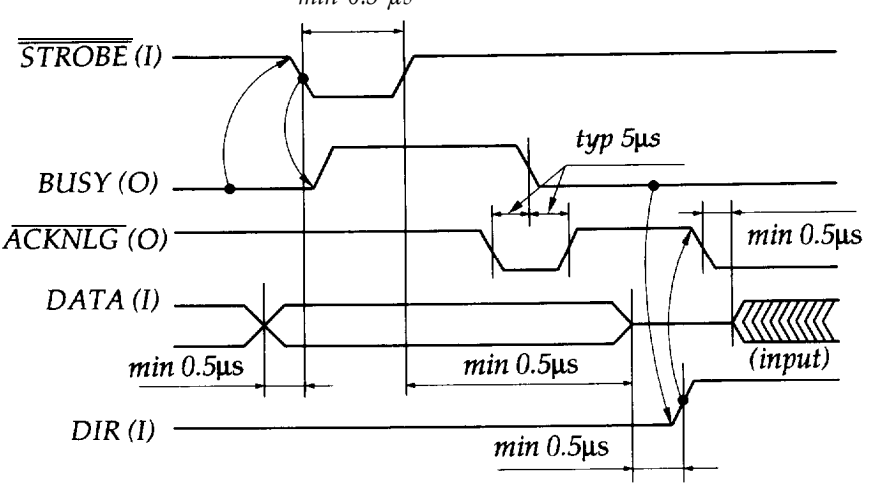
Timing charts

The figures below show the timing for the bidirectional parallel interface as viewed from the scanner.

OUT (from scanner to computer)



IN (from computer to scanner)



SCSI Specifications

Interface type: ANSI X3.131-1986 standard

Function: The following functions are included.

BUS FREE phase
ARBITRATION phase
SELECTION/RESELECTION phase
COMMANDphase
(Logical Unit number is fixed to 0 and command link function is not supported.)
DATA phase
Data in phase
Data out phase
STATUS phase
MESSAGE phase
(Includes MESSAGE IN phase and MESSAGE OUT phase)
ATTENTION condition
RESET condition

logic level: TTL level compatible

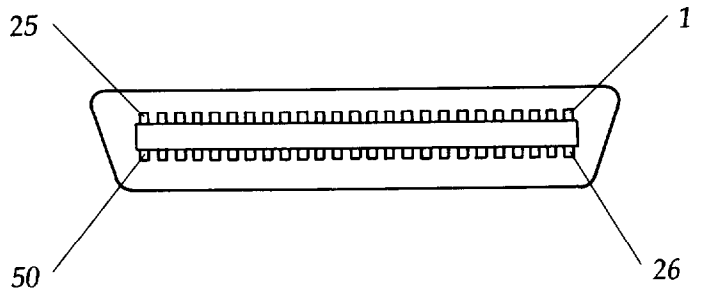
Electrical standard: As per ANSI X3.131-1986

Terminator: Internal terminator turned on or off by the switch

ID Setting: Selectable from 0 to 7 with the rotary switch.
(8 and 9 should not be selected.)

Connector type: Two spin connectors

Connector pin arrangement:



Signal pin assignments

In this table, the direction of the signals is given relative to the scanner.

Signal	I/O	Pin No.	Description
GND	—	1-12 14-25 35-37 39-40 42	Ground
NC	—	13	Not connected
DB0	I/O	26	Data bus 0
DB1	I/O	27	Data bus 1
DB2	I/O	28	Data bus 2
DB3	I/O	29	Data bus 3
DB4	I/O	30	Data bus 4
DB5	I/O	31	Data bus 5
DB6	I/O	32	Data bus 6
DB7	I/O	33	Data bus 7

Signal	I/O	Pin No.	Description
DBP	I/O	34	Data bus parity
TERMPWR	—	38	Termination power (+5V)
ATN	I	41	Attention
BSY	I/O	43	Busy
ACK	I	44	Acknowledge
RST	I	45	Reset
MSG	O	46	Message
SEL	I/O	47	Select
C/D	O	48	Control/Data
REQ	O	49	Request
I/O	O	50	Input/Output

Initialization

The scanner can be initialized (returned to a fixed set of conditions) in three ways.

Hardware initialization:

- When the power is turned on.
- When the scanner receives an INIT signal at the parallel interface (pin 31 goes low).

Software initialization:

- When the software command ESC @ (initialize the scanner) is received.

Default settings

The table below shows the default conditions when the scanner is initialized.

Item	Default
Data format	1 bit/pixel/color
Resolution	100 dpi
Size	100%
Reading area	848 × 1169 dots, no offset
Color mode	Monochrome (standard)
Brightness	0 (normal)
Halftoning mode	Mode A
Gamma correction	CRT Display A
Color correction	CRT Display

When the scanner is initialized, the scanner terminates the scanning operation, and the carriage returns to the home position (rear of the scanner).

DIP Switches

Switch	Description	On	Off
1-1	Self test	On	Off
1-2	Self test	Color	Monochrome
1-3	Color self test	Line	Page
1-4, 1-5, 1-6, 1-7	Not used	Always off	
1-8	ES-300C emulation	On	Off

Default setting: All off

Appendix

scanner Functions A-2
How the scanner works A-2
Scanner settings A-3

Scanner Functions

Various image processing functions are built into your scanner. They are briefly described in Chapter 3. This Appendix contains fuller, more technical, information. All functions must be controlled from the scanner software, and most functions can be combined with others to produce a variety of effects.

Note:
Because allfunctions must be controlled from scanner software, not all the scannerfunctions may be available, or the range of the settings may be limited. The software may perform unique **processes on** ***the*** *image data and the results can be diferent from those described in this manual. When using application software, see its documentation for details.*

How the scanner works

The image is divided into a two-dimensional matrix of tiny dots. Each dot is called a pixel, or picture element. The sensor on the carriage scans a line of pixels, and as the carriage moves, the succeeding lines of pixels are scanned.

The values of the electrical current for pixels are then processed and converted into binary data that can be used by computer devices.

Images such as photographs contain various, almost infinite, tones between black and white as well as various colors. These are detected as varied intensities of reflection. In monochrome reading, the scanner converts the intensities into the tonal data for each pixel. In color reading, the scanner separates the various colors into three primary colors, green, red and blue, and converts the tones of these colors for each pixel. By this method, the scanner can read any colors within the image.

The data produced by the scanner needs to be reproduced to be seen as an image. This is done, for example, by displaying the image data on a computer screen or printing it **on** a printer. The same image data can appear different depending on how it is reproduced. The various scanner functions aid in providing optimum reproduction results by adjusting the way the image is captured and converted into image data.

Scanner settings

The table below summarizes the scanner functions and the settings available on your scanner. Each of them is explained in the following pages. All of these functions are controlled by the software commands from your scanner software.

Function	**Available settings**
Resolution	23 settings from 50 to 600 dpi
Size	50% to 200% at 1% step
Data format	1 to 8 bits per pixel per color
Color mode	Color line sequence mode, color page sequence mode and monochrome mode (dropout color selectable)
Brightness	7 levels
Halftoning mode	3 modes and disabled 4 dither patterns
Gamma correction	5 settings for output devices
Color correction	4 settings for output devices

You may need to do some trials by yourself to find out your preferred settings because the original images and the output methods you use can vary greatly.

Resolution

The output resolution determines how many pixels, or dots, are used for scanning and reproducing an image. Resolution is measured in units of dpi (dots per inch). Some software uses the term pixels per inch (ppi). As the resolution value increases, the image is read and reproduced in finer detail. At 300 dpi, for example, an image of one square inch is represented by up to *90,000* dots.

The 23 resolution settings allow you to choose the best resolution for most types of printers. The settings available are *50, 60, 72, 75, 80, 90, 100, 120, 133, 144, 150, 160, 175, 180, 200,* 216, 240, 300, 320, 360, 400, 480, and 600 dpi. To find a matching resolution for your particular output device, follow the guidelines in Chapter 3. The default value of the output resolution is 100 dpi.

Size or scale

The size or scale function allows you to reduce or enlarge the size of the output image. The value can be set in the range of 50% to 200% in increments of 1%.

When the size is set to 100%, the image is scanned at the actual size for the current resolution. The size values determine the vertical and horizontal lengths of the image. When the size is set to 200% the image is enlarged four times the original size. When the size is set to 50%, the image size is reduced to one fourth of the original size.

The size function affects the number of dots scanned. An image scanned at 180 dpi and 200% has the same number of dots as an image scanned at 360 dpi and 100%.

To enlarge or reduce the image size, use the scanner's size function through your software. In your application software, perform only fine adjustments. Avoid changing the image size in your application especially if the image is scanned using halftoning, because the image quality deteriorates. The default size value is 100%.

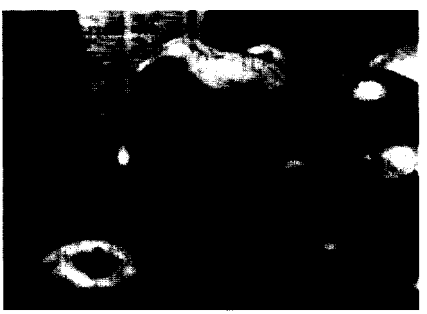
Data format

The data format specifies the number of bits used to represent the tone of a pixel. The data format can be set in the range of 1 bit to 8 bits per pixel per color.

As the value increases, more tones and colors can be captured in the scanned image. In monochrome, 1 bit/pixel (bi-level data) can represent only two levels of tones, black (0) or white (1). With 2 bits/pixel (quad-level data), four levels of tones can be represented by the binary values of 00, 01,l0 and 11. Using 8 bits/pixel corresponds to 256 shades of gray, producing near photographic quality results.

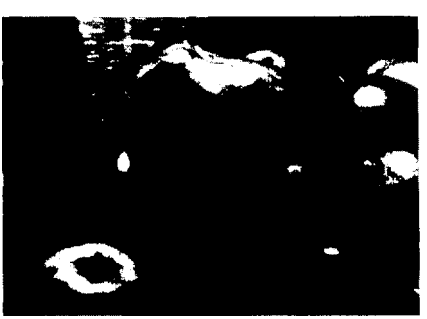
In color, the data format defines tones for each of the three primary colors of green, red, and blue. One bit/pixel/color can represent eight colors (2 x 2 x 2), and 2 bits/pixel/color can represent 64 colors (4 x 4 x 4). Eight bits/pixel/color (total 24 bits for a pixel) can represent over 16 million colors.

Data format	Monochrome	Color
1 bit/pixel/color	2 grays	8 colors
2 bits/pixel/color	4 grays	64 colors
3 bits/pixel/color	8 grays	512 colors
4 bits/pixel/color	16 grays	4,096 colors
5 bits/pixel/color	32 grays	32,768 colors
6 bits/pixel/color	64 grays	262,144 colors
7 bits/pixel/color	128 grays	2,097,152 colors
8 bits/pixel/color	256 grays	16,777,216 colors



8 bits/pixel

3 bits/pixel



2 bits/pixel

1 bit/pixel

To reproduce an image of more than 2 bits/pixel/color, however, the output device should also be capable of producing the same tones. Many displays and printers cannot deal with this and are limited to monochrome without gradations, or to 8 or 16 colors.

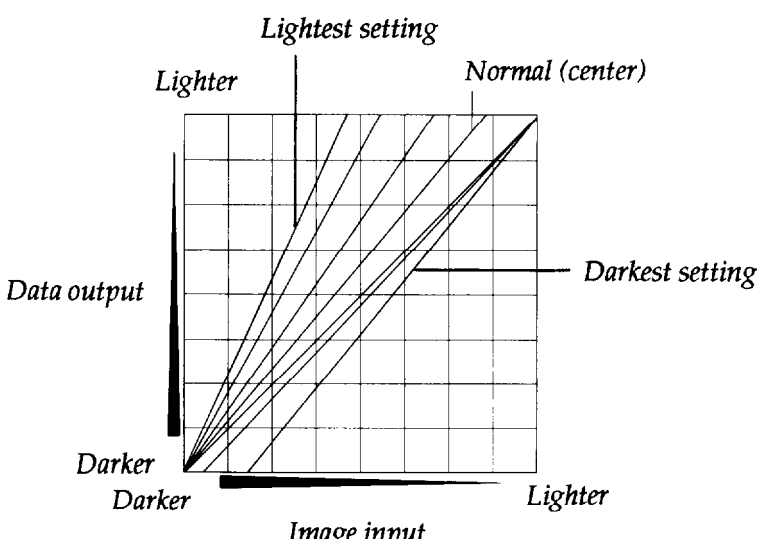
The data format chosen also affects the amount of data necessary for scanning and storing an image. The larger the bits per pixel value chosen, the larger the amount of image data becomes.

Brightness

One of seven brightness levels can be chosen for scanning. Medium is the normal setting.

It is better to use darker settings for line art, or faint original images, and to use lighter settings for darker original images. The brightness can be combined with any other function.

The graph below shows the differences between the brightness settings when the gamma correction is set for the CRT Display A setting.



Color mode

The color mode specifies color reading or monochrome reading. In color reading, you can choose either page sequence reading or line sequence reading. In monochrome reading, a dropout color can be specified (green, red, or blue).

- *Color page sequence reading*
  The scanner scans the document three times for green, red, and blue, and produces three pages of image data that combine to give full color image data. Since the image data can be divided into three sets, a computer with limited memory or processing speed can handle it more easily.

- *Color line sequence reading*
  The scanner scans the document with one pass of the carriage, reading green, red, and blue for every line. This yields more accurate color separation. Because the color for each pixel can be determined as soon as it is read, the color correction function can be used.

- *Monochrome reading (standard)*
  The scanner scans the document with one pass and reads the image in monochrome (black and white). In standard monochrome, your scanner illuminates the document with the green, red, and blue lights all at once so that minimum dropout color results.

- *Dropout colors (monochrome reading only)*
  The dropout color is the color you tell the scanner not to read. You can choose a dropout color from green, red or blue. Use a dropout color when you do not want to read one of these colors-for example, when scanning an image on a colored background.

The default color mode is standard monochrome.

Halftoning mode

Halftoning is a process of changing an image to a pattern of dots. This is required because a printing press produces images in a different way than photography does.

Photographs have an almost infinite number of tones, with an almost infinite number of colors for color photographs, but printing uses only individual single-color dots. Black and white images use black dots, and color images use only four colors of dots: cyan (blue), magenta (red), yellow, and black. The size and spacing of these dots is varied to simulate photographic continuous tones. In some halftoning the dots are quite noticeable, as you can see in the illustration on page 3-7 of this manual. If the dots are fine enough, however, the printed image appears to have continuous tones, as you can see on pages 16 and **18** of the *Color Image Scanner* booklet.

You can choose various types of halftoning at the time you scan, but it is nearly always best to choose halftoning of "off" or "none" and have the halftoning done by the image editing software or by the output device (such as a laser printer). The illustration on page 3-7 was scanned in color with no halftoning and printed on a black and white laser printer. The printer performed the halftoning so that it could print the image. You can see the dots in the illustration.

You will always get better results scanning from a photograph than from a printed image, such as a picture in a newspaper or magazine, because printed images have already been halftoned and you may see a conflict in the halftone methods. Therefore, you should not scan the color images in the *Color Image Sumner* booklet; use black and white or color photographs for better test results.

You can select from three types of halftoning, as well as enable or disable the halftoning process itself. When halftoning is disabled, the tones that the data can represent are determined by the data format. Halftoning is not available when 3 bits/pixel/color or more are selected as the data format, since halftoning is not necessary for such data. Halftoning modes B and C are not available with color line sequence reading.

Your scanner also provides four typical dither patterns for l- or 2-bits/pixel/color data format. With suitable software, you can define two more dither patterns.

Note:
Usually your scanner software **or** *printing method can pet-form the halftoning. Therefore, you should usually not use halftoning or dither patterns when you scan.*

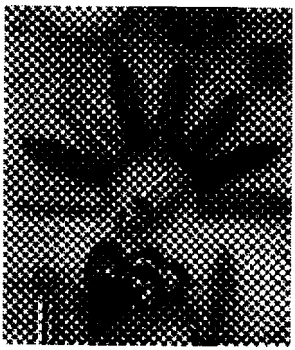
- *Halftoning mode A*
  This is the standard halftoning mode. The image is converted into a hard tone to produce a distinct image, and is suitable for most purposes. (1 and 2 bits/pixel/color)

- *Halftoning mode B*
  With this mode, the image is converted into a softer **tone.** This mode is suited for images **which** contain large areas of similar tones. (1 bit/pixel/color)

- *Halftoning mode C*
  With this mode, the image is represented in a way similar to the screen commonly used for newspaper photographs. The gradations of **the** tones are represented by clusters of different numbers of dots. (1 bit/pixel/color)

Halftoning mode A

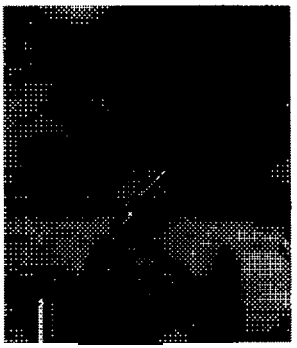
Halftoning mode B



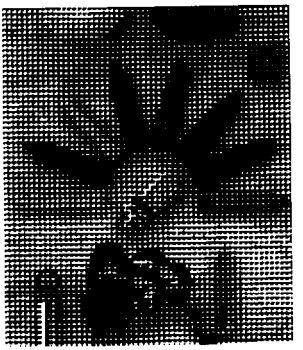
Halftoning mode C

None

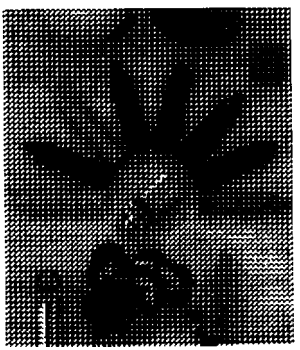
- *Dither pattern A*
  Halftone is expressed in 4 by 4 bayer dither pattern.
- *Dither pattern B*
  Halftone is expressed in 4 by 4 spiral pattern.
- *Dither pattern C*
  Halftone is expressed in 4 by 4 net screen dither pattern.
- *Dither pattern D*
  Halftone is expressed in 8 by 4 net screen dither pattern.



Dither pattern A



Dither **pattern** *B*



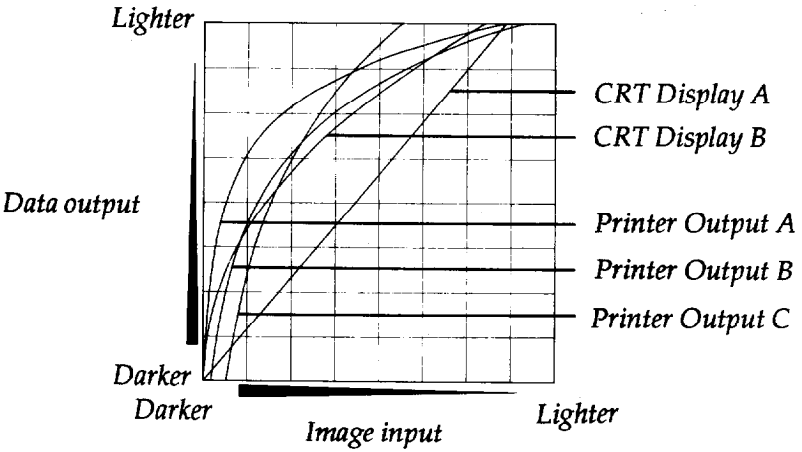
Dither pattern C

Dither pattern D

Note:
Changing the size of a halftone-processed image with your application software may degrade the image. Instead use the scanner's size or scale function at the time of scanning to select your desired image size.

Gamma correction

This function adjusts the light intensity ratio between the original image and the output data. When the image is reproduced on certain types of output devices, the tones of the image will be closer to those of the original. The term "gamma" (γ) means the shape and slant of the line on the graph that shows the ratio, as shown below.



Gamma correction provides five settings, and can be combined with all other scanner functions. Choose an appropriate setting from the five modes below.

- CRT *Display A*
  The output data is in proportion to the original image, as shown in the above graph. This setting is suited for most types of computer displays which can display an image in l-bit/pixel/color format. This mode is also suited for images without continuous tones, such as line art (γ = 1).

- *CRT Display B*
  This setting is suited for analog-input CRT displays which can display an image with multiple levels of tones of more than 1 bit/pixel/color (y = 2.2). This is usually the best setting.

- *Printer Output A*
  This setting is suitable for high-density printers, such as 24-dot printers and some page printers. The image is converted into a lighter image to compensate for the higher (darker) density of such printers. The image looks faint when viewed on a CRT display.

- *Printer Output B*
  This setting is suitable for low-density printers, such as 8-dot (9-pin) printers, and page printers. The image is converted into a slightly darker image to compensate for the lower (lighter) density of such printers. The image looks faint when viewed on a CRT display.

- *Printer Output C*
  This setting is suitable for high contrast printing of images which contain both picture and text. This setting gives higher contrast and more definition than either Printer Output A or B. The dark and light parts of images are accentuated by this method.

color correction

Color correction is functional only with color line sequence mode, because the color of a pixel is immediately determined when the pixel is scanned. Color correction provides four settings. To disable this function, simply choose color page sequence reading or monochrome reading.

This function processes the image data so that the data will be most suited for the characteristics of the color output device used. For example, CRT displays use the additive primary colors-green, red and blue-to produce other colors. On the other hand, printers use subtractive primary colors-magenta, cyan and yellow (and often additional black to give more definition), and colors can differ slightly depending on the printing methods or the types of ink used.

- *CRT displays*
  This setting compensates colors for the characteristics of color CRT displays.

- *Impact dot-matrix printers*
  This setting compensates colors for the characteristics of impact dot-matrix color printers.

- *Thermal transfer printers*
  This setting compensates colors for the characteristics of thermal transfer color printers.

- *Ink jet printers*
  This setting compensates colors for the characteristics of ink jet color printers.

Glossary

additive primary colors

Primary colors which produce white when mixed in a certain proportion. These are red, green, and blue-the colors of the scanner lamps.

bi-level data

Image data which is composed of 1 bit/pixel. A pixel is represented by a single bit of digital data that can express only 1 (light) or 0 (dark).

bit

Short for binary digit. The smallest unit of data in computer processing. A bit can represent two values, on and off, or 1 and 0.

bit/pixel

The unit to indicate the number of bits allocated for a pixel. The larger the value, the more detail of a pixel is represented.

brightness

A scanner function to lighten or darken the output image data.

byte

A unit of information consisting of eight bits. A byte can represent a control code or character.

carriage

A component of the scanner which contains the optical sensor and light source for scanning.

color correction

A method of adjusting the color image data for a particular type of device **so that** the reproduction results become close to the original colors.

color separation

A process to convert full color images into a limited number of primary colors. The additive primary colors (red, green, and blue) are used by the scanner and the subtractive primary colors (cyan, magenta, and yellow) plus black are used for printing press separations.

default

A set of values used when no other selections have been made.

dithering

A process in **which software** or **an** output device simulates continuous tones with groups of dots.

document

The physical item, such as a sheet of paper or a book, that you place on **the** document table for the scanner to read.

dpi

Short for dots per inch. A unit of measurement for resolution. The **higher** the value, the higher the resolution.

dropout color

A color you set the scanner not to recognize.

ESC/I

Abbreviation for Epson Standard Code for Image scanners. A system of commands to control image scanners with software.

ESC/P

Abbreviation for Epson Standard Code for Printers. A system of commands to control printers with software.

gamma correction

A method of adjusting the gamma curve so that the reproduction results on different types of output devices have gradations similar to the original image.

gamma curve

The graph that shows the contrast ratio between the input (original image) and output (image data) in image processing.

halftoning

A data processing method of converting continuous tones into digital data so that the output data simulates the tones. Used for bi-level and quad-level data.

home position

The position at the back of the scanner where its carriage rests before a scanning operation.

imagesetter

A device that uses computer files to produce high-resolution text and graphics output on film or paper. These are usually found in service bureaus and printing companies.

impact printer

A printer that transfers ink onto the paper by striking the inked ribbon with a number of small pins.

ink jet printer

A printer that transfers ink onto the paper by spraying it through a number of small nozzles.

interface

A piece of hardware, a method, or a standard used for connection between or among computer devices.

line sequence

A type of color scanning that separates primary colors line by line. The carriage makes only one pass.

monochrome

Black and white images, or images represented only by the intensity of luminosity.

multi-level data

Image data that consists of more than one bit per pixel.

page sequence

The type of color scanning in which the entire image is scanned once for each separation color.

plain bi-level

Bi-level image data without the halftoning process.

pixel

Short for picture element. Each image is composed of a number of pixels. Pixels are also counted in units of dots.

port

An interface channel through which data is transmitted between devices.

primary colors

Basic colors. See additive primaries and subtractive primaries.

resolution

Indication of how finely an image is resolved into pixels. Measured in dots per inch (dpi) or pixels per inch (ppi).

scan

An operation performed by the sensor and the carriage. The image is divided into pixels by scanning.

scanning area

The physical size of the image that can be scanned by the scanner.

self test

A built-in function to check the operation of the scanner.

subtractive primary colors

Primary colors that produce black when mixed in certain proportion. These are yellow, cyan and magenta. In printing, black is often added to give more definition because mixing of actual inks cannot produce pure black.

thermal transfer printer

A printer **that** transfers ink onto the paper with **heat** generated by a number of small heating elements.

threshold

A value that is referenced to determine whether a certain value is larger or smaller. The scanner uses a number of thresholds to convert an image into digital data.

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Epson America, Inc.
20770 Madrona Avenue
Torrance, California 90503

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